HFS – Motorised Fire Damper

Model: **HFS-R-146**

The Holyoake HFS-R-146 is a fire rated motorised steel damper, for the prevention of the spread of fire through ducted air systems, or between plenums. Self contained as a fire damper and externally operable by electric, or pneumatic actuator; constructed to comply with AS 1668.1, 1998 and AS 1682.1, 1990.

Fire Rating: Tested in accordance with AS 1530.4,1990, integrity was maintained for a minimum of 4 hours. For purposes of the Australian and New Zealand Building Code they have a F.R.L./F.R.R. of – / 240 / –

Tests: BRANZ Fire Test Certificate No. FTC 390, HFS-R-146 mounted in a concrete wall, or floor. **(Certified for 240 minute fire rating).**

BRANZ Fire Test Certificate No. FTC 391, HFS-R-146 mounted in a plasterboard wall. **(Certified for 30 and 60 minute fire rating).**

(Certificates are available upon request).

Mounting: Sleeve mount in accordance with AS 1682 - 1990, Part 2, and generally as described on pages 339H - 344H and 325H, with blade axles located within the fire partition. Sleeves and mounting angles are furnished as standard. Holes through walls, or floors must be sized to provide room for expansion in accordance with AS 1682.1 - 1990. HFS-R-146 requires a 12 mm tolerance gap on all four sides.

Actuators: Because of critical fitting requirements, actuators must be factory fitted. Factory supplied make may vary from time to time.

Specify: (a) Make.
(b) Voltage (if electric).
(c) Pressure range (if pneumatic).
(d) Spring, or non-spring return (if electric).
(e) Fail open, or closed (if spring).
(f) Temperature rating.

Standard Construction

Dimensions: **Nominal** Size is **sleeve ID**, always stated as W x H, in that order

Note: Add 6 mm to Nominal W (Width) and Nominal H (Height) for Internal Duct size

Minimum Nominal Size: 200 mm Wide x 230 mm High.

Maximum Nominal Size: 900 mm Wide x 1113 mm High.

Frame: Mild steel grade G250 galvanised to Z275, 167 x 23 x 1.15 mm roll formed hat section, with machine notched joints and corner gussets.

Blades: Mild steel grade G250 galvanised to Z275, 157 x 1.15 mm roll formed "double vee and hex, on 146 mm shaft centres.

Blade Seals: Silicon seal on blade edge.

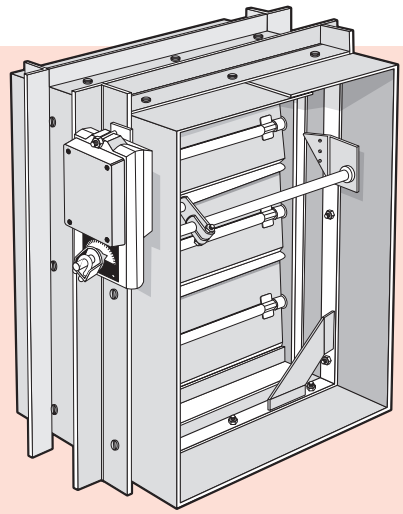
Side Seals: Stainless steel.

Blade Linkage: External in frame, concealed between frame and mounting sleeve.

Bearings: 12.5 mm I.D. x 28 mm O.D. grease-packed ball races, pressed into frame.

Control Shaft: 12.5 mm O.D. x 1.2 mm wall 304 stainless steel tube.

Control Linkage: 71ºC fusible link driven crank type, with integral constant force return spring.



HFS-R-146
With Sleeve and Actuator.

Latch: Stainless steel with 71ºC fusible link.

Axles: 84 mm long hex, M.S. bright zinc-plated pins, mechanically locked and welded to half hex blade channel.

Cranks: 6 mm M.S. bright zinc-plated, fitted to hex pin and S.S. link bar pin.

Blade Rotation: Parallel only.

Finish: Mill.

Maximum Velocity: 10m/s

Frame Bracing: Diagonal corner braces on all dampers above 300 x 300.

Handing: Standard left hand as illustrated. Alternative right hand is available, specify when ordering.

Remote Indication: All units are fitted with a normally open single pole limit switch activated by the blade. Standard is set to close circuit on damper closure. Alternative (close circuit on damper opening) is available, specify when ordering.

Sleeve Material: Galvanised Steel.

Maximum Dimensions

Per Side mm	Sleeve Thickness mm
0-300	0.45
301-762	0.55
763-1113	0.75

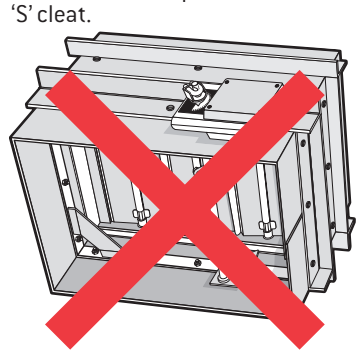
Mounting Angles: 40 x 60 x 2 mm galvanised steel angle, (x4 per side, x2)

Installation: **HFS-R-146 dampers must not be installed with the axles vertical.**

They may be used in either vertical, or horizontal planes, with air flow and fire exposure from either direction.

Dampers must be fixed square and free from racking.

Duct Connection: Mounting Sleeves are supplied raw edged. Duct Joints to the damper must be "Break-away" type e.g. 'S' cleat.



Model: **HFS-R-146**

For maximum open free area, select exact modular height.
Exact modular height is where H = H Min.

For non modular height use the following:
Determine number of blades from Table 1, then:

Top + Bottom Blade Centres

$$A = \left[\frac{H - H\ Min}{2}\right] + A\ Min$$

Blade Stop Heights

$$B = \left[\frac{H - H\ Min}{2}\right] + B\ Min$$

Jack Shaft Centre From Top of Casing

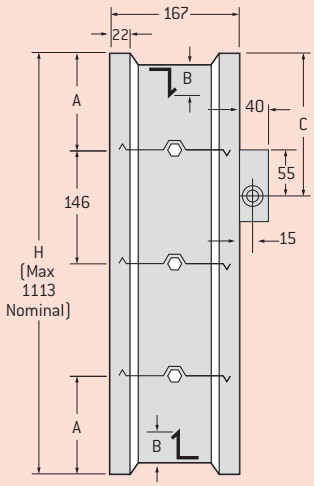
$$C = \left[\frac{H - H\ Min}{2}\right] + C\ Min$$

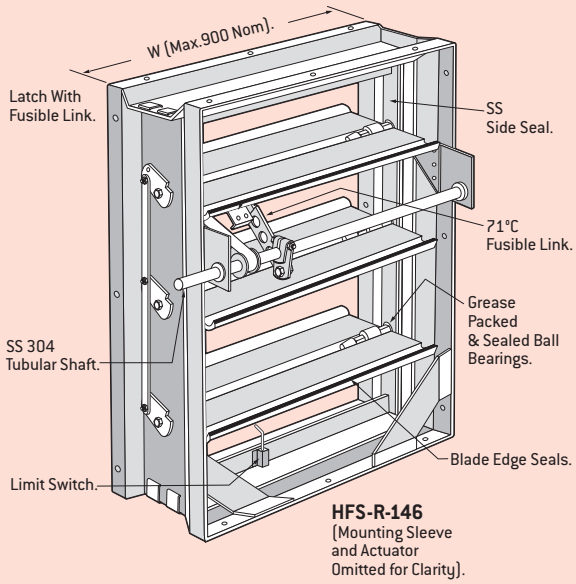
e.g. 300 Height

A 300 = $\left[\frac{300 - 230}{2}\right]$ = 35 + 115 = 150

B 300 = $\left[\frac{300 - 230}{2}\right]$ = 35 + 33 = 68

C 300 = $\left[\frac{300 - 230}{2}\right]$ = 35 + 175 = 210



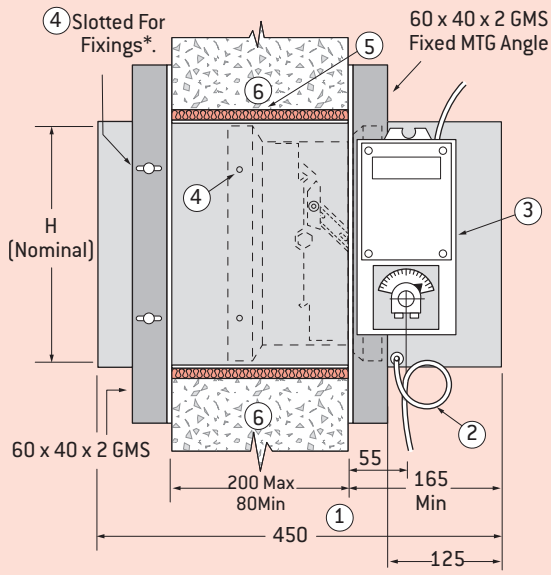


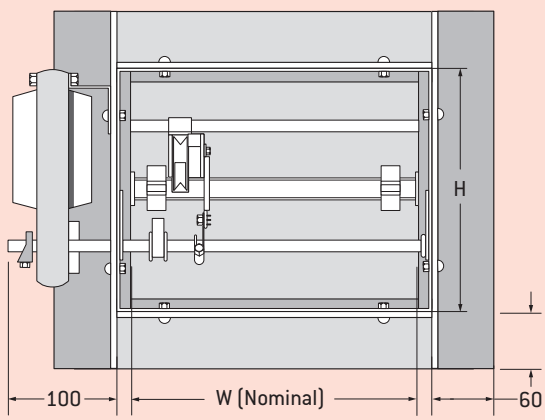
HFS-R-146
(Mounting Sleeve and Actuator Omitted for Clarity).

TABLE 1 - NOMINAL DIMENSIONS

No. of Blades	1	2	3	4	5	6	7
H Min	230	376	522	668	814	960	1106
H Max	375	521	667	813	959	1105	1113
A Min	115	115	115	115	115	115	115
B Min	33	33	33	33	33	33	33
C Min	175	175	175	321	467	613	759

Note: Add 6 mm to Nominal W (Width) and Nominal H (Height) for Internal Duct Size.





Notes

1. Standard sleeve length of 450 mm will accommodate walls 80 - 200 mm thick. For other wall depths, specify special length.
2. Limit switch tails.
3. Typical actuator. For smallest damper, fits within overall damper and mounting angle height.
4. No. 10 Steel Screws (* Refer to page 339H 'Fire Damper Installation Notes').
5. Packing in the expansion gap, High Temperature Mineral Wool, (Supply and fit by others).
6. Multiple assemblies need to be individually operated and separated by a minimum of 200 mm of structural support, (in either width, or height); of the same fire rating and structural integrity as the surrounding wall.
7. Illustration details an example of arrangement to be supplied and is as tested.
8. Trim sleeves as per note 6 on page 344H, to comply with AS 1682, Part 2, 1990.

HFS – Performance Data

Model: **HFS-R-146**

AREA FACTOR TABLE																
Nom Ht.	No. of	Nominal Width (mm)														
(mm)	Blades	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
230	1	66.56	48.91	38.66	31.97	27.24	23.74	21.03	18.88	17.13	15.67	14.45	13.40	12.49	11.70	11.00
376	2	29.31	21.54	17.02	14.07	12.00	10.45	9.26	8.31	7.54	6.90	6.36	5.90	5.50	5.15	4.84
522	3	18.79	13.81	10.91	9.02	7.69	6.70	5.94	5.33	4.84	4.42	4.08	3.78	3.53	3.30	3.11
668	4	13.83	10.16	8.03	6.64	5.66	4.93	4.37	3.92	3.56	3.26	3.00	2.78	2.59	2.43	2.29
814	5	10.94	8.04	6.35	5.25	4.48	3.90	3.46	3.10	2.81	2.58	2.37	2.20	2.05	1.92	1.81
960	6	9.05	6.65	5.26	4.35	3.70	3.23	2.86	2.57	2.33	2.13	1.96	1.82	1.70	1.59	1.50
1106	7	7.72	5.67	4.48	3.71	3.16	2.75	2.44	2.19	1.99	1.82	1.67	1.55	1.45	1.36	1.28

Note: Add 6 mm to Nominal W (Width) and Nominal H (Height) for Internal Duct Size.

Use the table and chart to determine the pressure drop through HFS – R– 146 Fire Dampers.

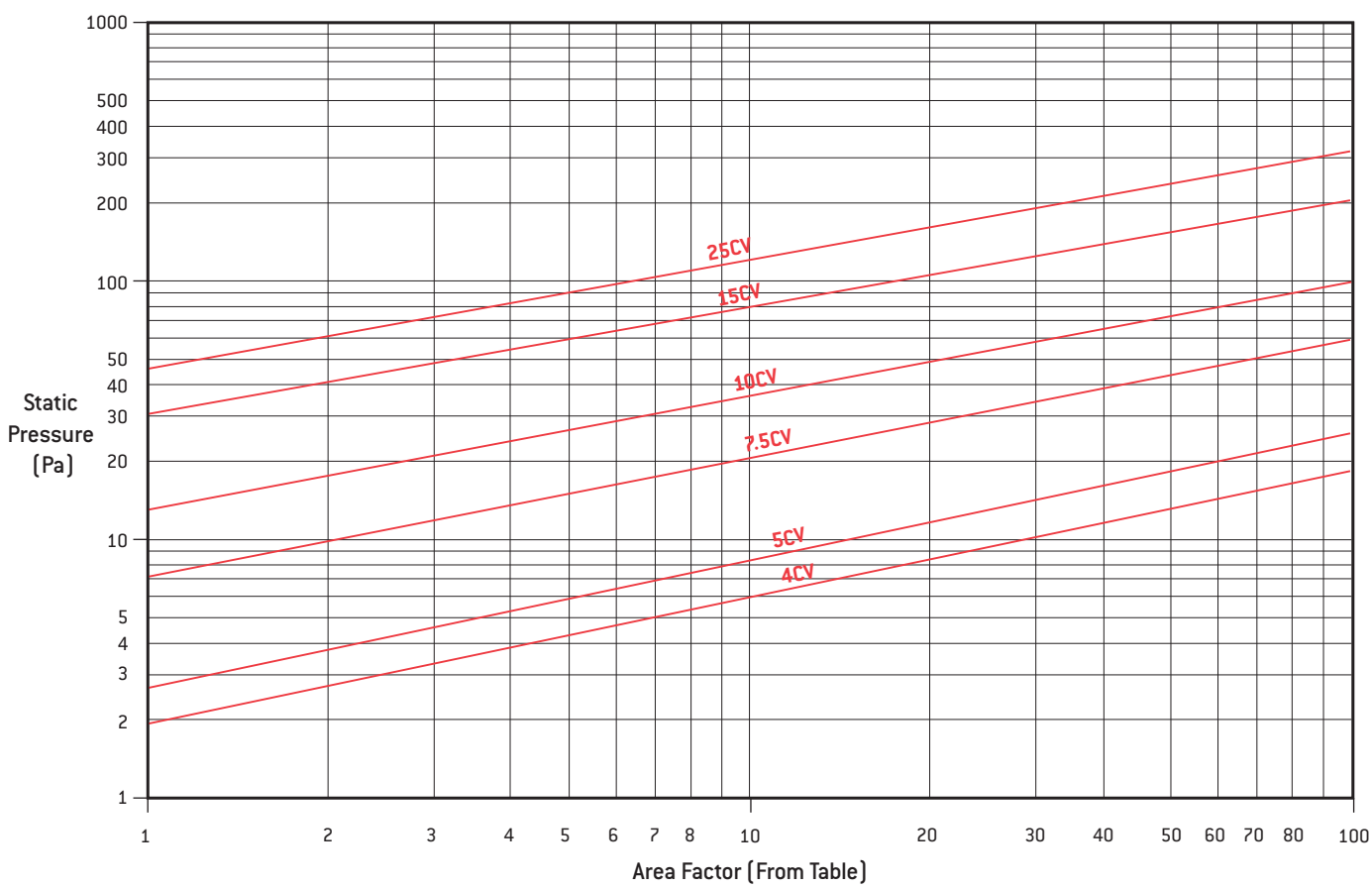
1. Determine area factor for damper by entering the area factor table with duct width and height.
2. Find conversion velocity (CV) by multiplying area factor for selected size damper by flow rate in m^3/s. CV = Area Factor x m^3/s.
3. Enter pressure drop chart with area factor and proceed up to the appropriate conversion velocity (CV) line.
   Read the pressure drop (Pa) on the left hand side of the chart.

Example:

Find the pressure drop across a 350 wide x 814 high model HFS-R-146 Fire Damper handling 1.3 m^3/s.

1. From the table the area factor is 5.25.
2. CV = 1.3 x 5.25 = 6.825.
3. From pressure drop chart, Pressure Drop is 12Pa.

(Note: Interpolations while not precise, are adequate for most calculations).



Notes

1. Static Pressure and Conversion Velocities are correct for 1.2 kg/m^3 air density.
2. Pressure drop data is for dampers tested with ductwork on both the up and downstream sides.These values need to be suitably increased where dampers are mounted with ductwork on one side only, or when mounted onto plenum walls. (Refer to SMACNA, or ASHRAE System Design Guides).
3. Data is for the specific sizes listed in the Area Factor table. For other sizes use the next size down and make a proportional adjustment based on the approximate increase in free area.